

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
31 July 2003 (31.07.2003)

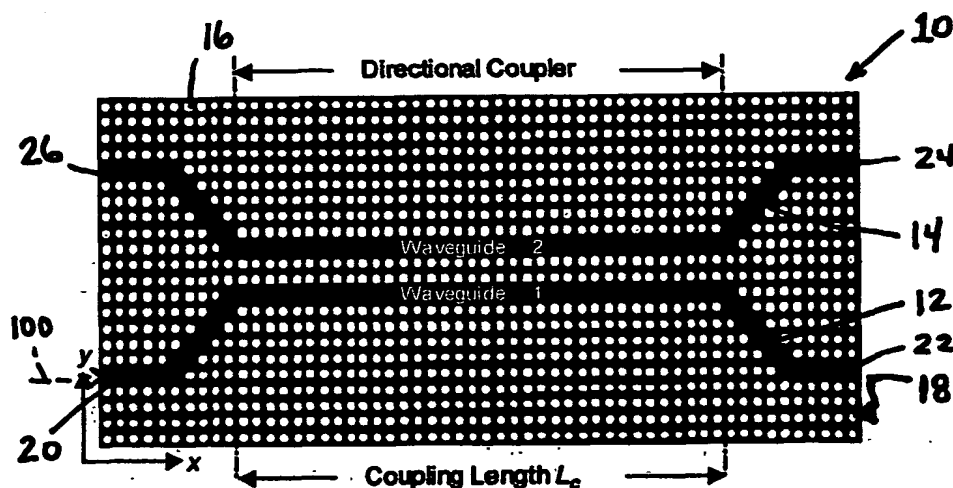
PCT

(10) International Publication Number
WO 03/062882 A3

- (51) International Patent Classification⁷: G02B 6/26, 6/42
- (21) International Application Number: PCT/US03/01384
- (22) International Filing Date: 17 January 2003 (17.01.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/350,749 22 January 2002 (22.01.2002) US
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- (81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI,
SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).
- Declaration under Rule 4.17:
— of inventorship (Rule 4.17(iv)) for US only

[Continued on next page]

(54) Title: ELECTRO-OPTICAL SWITCHING USING COUPLED PHOTONIC CRYSTAL WAVEGUIDES



(57) Abstract: An electro-optical switch (10) implemented in coupled photonic crystal waveguides (12, 14) is disclosed. The switch (10) is proposed and analyzed using both a finite-difference time-domain ("FDTD") method and a plane wave expansion ("PWM") method. The switch (10) may be implemented in a square lattice (18) of silicon posts in air, as well as in a hexagonal lattice (38) of air holes in a silicon slab. Switching occurs due to a change in the conductance in the coupling region between the photonic crystal waveguides (12, 14), which modulates the coupling coefficient and eventually causes switching. Conductance may be induced electrically by carrier injection or optically by electron-hole pair generation. The electro-optical switch (10) has low insertion loss and optical crosstalk in both the cross and bar switching states.

Best Available Copy



Published:

— with international search report

(88) Date of publication of the international search report:

16 October 2003

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/01384

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G02B 6/26, 6/42

US CL : 385/50, 125

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 385/14,39,123,129,130

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
INSPEC

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
photonic near3 crystal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X, P ✓	US 6,542,682 B2 (COTTEVERTE et al) 01 April 2003 (01.04.2003), see figure 22, column 11, lines 5-39.	1-16, and 18-29
X, P — Y, P	US 2002/0021878 A1 (ALLAN et al) 21 February 2002 (21.02.2002), see figure 25, [0064].	1-2,4-9, 11-16, 19-24, and 26-29.
Y ✓	US 2001/0026668 A1 (YAMADA) 4 October 2001 (04.10.2001), see figures 8 and 9, [0132] - [0137].	3,10,18, and 25 1-16, and 18-29
Y ✓	JP 2001281480 A (YAMADA) 10 October 2001 (10.10.2001), see figure 4, abstract.	1-16, and 18-29

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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"&"

document member of the same patent family

Date of the actual completion of the international search

04 April 2003 (04.04.2003)

Date of mailing of the international search report

02 JUL 2003

Name and mailing address of the ISA/US

Commissioner of Patents and Trademarks
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